Uranus on the Hypothesis of Disturbances caused by a more Distant Planet. By J. C. Adams, Esq. M.A. *By the Author.*

Scheikundige Onderzoekingen gedaan in het Laboratorium der Utrechtsche Hoogeschool. Deel 4de., Stuk 1ste.—*By the Editors.*

Guide to the Geology of Scotland. By James Nicol, Esq.—*By the Author.*

Account of Iceland, Greenland, and the Faroe Islands. By the same.—*By the Author.*

Specimen of Metamorphic Limestone, dislocated by the vicinity of Trap-Rocks, near North Berwick.—*By Sir G. S. Mackenzie, Bart.*

Monday, 15th February 1847.

Dr CHRISTISON, Vice-President, in the Chair.

The following Communications were read:—

1. A Speculation, connecting the origin of Trap-Tuff, the cause of Earthquakes, and of Partial Changes of the Bed of the Ocean. Part II. By Sir G. S. Mackenzie, Bart.

The author, having observed in Iceland some remarkable intermixtures of lava with volcanic tuff; and, more recently, on the coast of East Lothian, a somewhat similar intermixture of masses of greenstone in trap-tuff, conceived the idea that cavities existed underneath the crust of the earth, or deeply seated within it, containing water exposed to heat, and the agitation of which, occasioned by the production of steam, had reduced the materials of trap-tuff to the state in which we find them, which had been afterwards erupted at the bottom of the sea, or forced between the beds of superincumbent rocks. Some time afterwards, on reading the researches of Mr Hopkins in Physical Geology, he was gratified to find that profound philosopher advocating the existence of vast cavities containing lava, and connected with volcanic vents at a depth such as would admit of steam-power throwing the lava to the surface. It did not now appear difficult to imagine similar cavities containing heated water, and the materials of trap-tuff; and he therefore extended the hypothesis of Mr Hopkins so as to account for its origin, and for masses of trap occurring in it, the form of which seemed to indicate that they had been forced into the tuff at the time of its eruption, from some neighbouring cavity containing melted matter.

The author next adverted to the phenomena of earthquakes; and referring to the Great Geyser, the eruptions of which, at the time when he saw it, were preceded by sounds resembling the discharges of artillery, and trembling of the ground, he inferred that the noises and shaking of the ground during earthquakes, were caused in the same manner in great cavities, such, most probably, as those which contained the materials for trap or volcanic tuff. The cause of the noises the author conceived tc be the occasional production of masses of steam, reaching the upper and colder portions of the cavity, or coming in contact with water and being suddenly condensed, so as to produce a vacuum with extreme rapidity, the collapse, on its being instantly filled up, causing sound and concussion. To explain this part of the subject, he referred to a paper on sound, which he had read to the Society some years before, and part of which will appear in the number of Jameson's Journal for April 1847.

The author next proceeded to extend the hypothesis of Mr Hopkins farther; and endeavoured to shew, that the operations going on within the cavities would necessarily go on extending their dimensions, and weakening their roofs. This weakening would be greatly increased by the eruption of the contained matter, and the enormous masses of igneous rocks existing in volcanic districts and elsewhere, proves that proportional spaces must have been left empty underneath. Vast tracts of land by being thus undermined may have sunk and disappeared under the ocean. Several geologists have supposed it probable, from various facts, that Europe and America were once united, the Northern Atlantic having been occupied by land. This being admitted, the author referred to the probability of the sinking of the land having been caused (perhaps in large portions at different periods) by the extension of such cavities as those which Mr Hopkins has supposed to exist, and to their roof giving way. The British Islands, the Faroe Island, and Iceland, may be regarded as remnants of the lost continent; and the latter island exhibits the strongest possible indications of preparation for the catastrophe of its disappearance. The precipitous shores of these remnants prove that violent fracture had taken place; and that this island had been more elevated at a former period, is rendered probable by the exceedingly shattered condition of their rocks. Admitting this, and the extension of the land over the Atlantic, the climate of Britain must formerly have been severe enough to produce glaciers, which have left those marks which have been ascribed to them.

The author took occasion to shew, that the effect of the sudden sinking of a great mass of land, and the access of the sea to the emptied space, would be to raise, by vast currents rushing into it, an enormous mass of water to a great height, forming a huge initiatory wave, consisting of greatly agitated water, loaded with the debris of the former land, as well as terrestrial and aquatic animals, many of them dragged from warmer latitudes, by the violent currents rushing from all sides towards the empty space. This huge mass of water, as soon as its weight balanced and overcame the momentum of the current that had lifted it, would produce a wave which, being propagated till it reached our land, would break over it, and form powerful currents guided by the inequalities of the land, and leaving behind them the detritus which at present covers the rock surface.

The author also noticed, in consequence of some discussion that had taken place on the appearances presented by the diluvial masses, a fact he had several times observed, shewing that the appearance of stratification might not, in every case, depend on deposition from water comparatively at rest. On artificial heaps of heterogeneous matter which had been left undisturbed for many years, being cut down, he had noticed, and pointed out to others, that the materials had arranged themselves in lines, in the manner of flint in chalk, and strata of finer materials. Hence he supposed it probable that, in many cases, the diluvial masses had, in like manner, arranged themselves, and assumed a stratified appearance. He was led also to the inference that, instead of having been quietly deposited, many of the great masses of sandstone, now exhibiting distinct layers, had been produced at once by ancient debacles.

2. On Vital Affinity. Parts II. and III. By Dr Alison.

In continuation of his former paper, Dr Alison proceeded to review the chief facts known in regard to the formation of the *oils* and the *albuminous* compounds in organized bodies, with the view of illustrating the modification given by vitality to chemical affinities. The formation of fat or oil in vegetables appears to be effected simply by the separation of oxygen from some of the varieties of starch; but in animals, where no oxygen is evolved, and where, nevertheless, oily compounds may certainly be formed from starch (as shewn by Liebig, Chevreul, and Milne-Edwards), this appears to be effected by an affinity of the greater part of the carbon and hydrogen of the starch, for a small part of the oxygen, to form fat,